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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
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09/268,948 03/16/99 TAKAHASHI

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IM22/0522

EXAMINER

CANTELMO, G

ART UNIT

PAPER NUMBER

1753

DATE MAILED:

05/22/01

13

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary

Application No.
09/268,948

Applicant(s)
Takahashi

Examiner
Gregg Cantelmo

Art Unit
1753



-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on May 10, 2001
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 35 C.D. 11; 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1, 2, and 10-13 is/are pending in the application.
- 4a) Of the above, claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1, 2, and 10-13 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claims _____ are subject to restriction and/or election requirements.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are objected to by the Examiner.
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

- 13) ☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).
- a) ☐ All b) ☐ Some* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

*See the attached detailed Office action for a list of the certified copies not received.

- 14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

- 15) ☐ Notice of References Cited (PTO-892)
- 16) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 17) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s). _____
- 18) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 19) ☐ Notice of Informal Patent Application (PTO-152)
- 20) ☐ Other: _____

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DETAILED ACTION

Response to Amendment

1. In response to the amendment received on May 10, 2001:
 - a. The 102 rejection drawn to Takahashi stands;
 - b. The 103 rejection drawn to Kano is stands;
 - c. The double patenting rejection is withdrawn.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

3. Claims 1-2 and 10-13 are rejected under 35 U.S.C. 102(a) as being anticipated by Takahashi 1993, of record and for the reasons of record.

Therein Takahashi 1993 discloses forming Fe-N onto a MgO substrate films using a facing (otherwise understood as opposing) target type DC sputtering apparatus (page 3040, second column and page 3041 first column). The process is performed under identical plasma conditions T_e is within a range of about 0.2 eV and 0.6 eV and N_e is about 10^9 cm⁻³. The result was an Fe-N sputtered film wherein only diffracted line of (002) from α' is observed (page 3041, second

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column). Since the opposed DC sputtering is performed under the same plasma conditions the film formed will inherently have the same properties. The structure of the film will be an α -Fe₁₆N₂ single phase (page 3041, column 1 as applied to instant claims 1 and 10-11).

The method of forming the film is not germane to the issue of patentability of the film itself. Therefore the limitation of alternating DC sputtering has not been given patentable weight (as applied to instant claim 2).

The iron nitride film is formed on an iron underlayer on the substrate (page 3041, first column, paragraph beginning with “[prior to the fabrication]”, as applied to claims 12 and 13).

Response to Arguments

4. Applicant's arguments filed May 10, 2001 have been fully considered but they are not persuasive. In particular:

A prima facie case is made out under 35 U.S.C. 102(a) if, within 1 year of the filing date, the invention, or an obvious variant thereof, is described in a “printed publication” whose authorship differs in any way from the inventive entity unless it is stated within the publication itself that the publication is describing the applicant's work. In re Katz, 687 F.2d 450, 215 USPQ 14 (CCPA 1982).

Applicant may be able to rebut this rejection by showing the reference's disclosure was derived from applicant's own work (See MPEP § 2131.01). However at the time of response, Applicant has not received declarations from the necessary people. This rejection stands.

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Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 1-2 and 10-11 are rejected under 35 U.S.C. 102(b) as being anticipated by Kano of record and for the reasons of record.

Kano discloses of a magnetic thin film manufacturing method comprising: introducing argon and nitrogen into a chamber holding a substrate (page 8332, under the subheading "Experimental Procedure" lines 1-7); applying DC power to an iron target in the atmosphere (page 8332, second column, lines 9-12). Furthermore the substrate temperature is less than 200 degrees Celsius (page 8332, second column, lines 5-8). Therefore, since the substrate temperature is below 200 degrees Celsius and the iron target is sputtered in an argon and nitrogen atmosphere via DC power, Kano will inherently generate the same nitrogen martensite α' phase. The nitrogen gas flow percentage is within the claimed range of 1- to 25 % (Fig. 1). The presence of an α Fe film is taught (page 8333, lines 45-47). Kano also teaches of heat treating the film (page 8333, lines 28-36; Fig. 4).

It is also clear that Kano teaches that, with respect to a Fe_{16}N_2 film, it is inherent that the temperature be below 200 degrees Celsius to prevent the film from decomposing (page 8333, lines 41-47). Furthermore, since Kano discloses the importance of the Fe_{16}N_2 film (page 8332,

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under subheading "Introduction", lines 13-15) and that temperatures above 200 are undesirable due to the adverse effects such a temperature range would have on a Fe_{16}N_2 film, and that the instant application employs the same process conditions to obtain a desired crystalline phase, Kano will inherently generate the same crystalline phase.

Kano discloses of the electron voltage range of the instant claims (page 8332, second column, lines 11-12). By varying the electron voltage, the density of the electrons will vary in direct relation to the electron voltage variance. Having disclosed such a range, it is the examiner's position that the electron voltage range of Kano will generate a range of electron densities which will overlap or encompass the instantly claimed electron density range. Having such an overlap would obviously generate the same film as that claimed in the instant application. Therefore it is expected that since the Fe_{16}N_2 is formed under the same conditions as the instant application, the resultant film will have the same crystal orientation.

The method of forming the film is not germane to the issue of patentability of the film itself. Therefore the limitation of alternating DC sputtering has not been given patentable weight (as applied to instant claim 2).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the process of Kano by selecting the desired electron density range since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

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7. Claims 12 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kano as applied to claims 1-2 and 10-11 above, and further in view of Takahashi.

The difference not yet discussed is of disposing an underlayer of iron on the substrate and then depositing the iron nitride film atop the underlayer.

Both Kano and Takahashi are drawn to depositing iron nitride films having higher Bs. While Kano does not appear to explicitly disclose of disposing an iron underlayer. Takahashi does so to impart a desired (001) grain orientation.

The motivation then for disposing an iron underlayer is to impart a desired grain orientation for the deposited films.

Therefore it would have been obvious to the skilled artisan at the time the claimed invention was made to modify the teachings of Kano by depositing an iron underlayer since it would have imparted a desired grain orientation for the deposited films.

Response to Arguments

8. Applicant's arguments filed May 10, 2001 have been fully considered but they are not persuasive. In particular:

Applicant states that the Kano reference discloses a substrate temperature less than 200 degrees Celsius (page 2, lines 16-17 of the amendment). One of ordinary skill in the art would reasonably expect that under the claimed conditions (i.e. DC reactive sputtering of iron in the presence of nitrogen), the prior art of record would generate the same film. Furthermore since

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the deposition temperature of the prior art is under 200 degrees Celsius, one would expect formation of a similar film phase.

In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., of a process temperature or electron density) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

These parameters are drawn to the process conditions under which the instantly claimed film is formed. While the parameters between the prior art and instant disclosure may not be verbatim, applicant provides no clear evidence that the prior art of Kano does not generate the same film. In fact, it would appear that according to the amendment at page 3, lines 6-20, such evidence is not known to applicant. Therein applicant states that applicant has not discovered a way to determine the structure nor analyze it. If this is true then how can the examiner or applicant be certain that the prior art of record does not have the same structure when it appears that applicant cannot readily analyze it for structural comparisons?

Due to the close nature of the prior art reference and the instant claimed invention, there is evidence providing the basis for expectation that the prior art of Kano forms the same iron nitride film having the same phase. While Applicant asserts a position contrary to this, there is no conclusive evidence that the prior art does not generate such a phase. Kano deposits an iron nitride film via DC reactive sputtering in the presence of a nitrogen gas at a temperature below

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200 degree C. The instant claims recite the same features of a process to generate the particular film. One would reasonably expect that the prior art of Kano would generate the same film since it employs the same claimed process limitations.

If possible, applicant is invited to provide a side-by-side comparison of the prior art film and instantly claimed film with factual evidence that the prior art film is not the same as the claimed invention.

Furthermore, while applicant is entitled to express a structure by method, applicant is also requested to provide evidence that the prior art process clearly does not form a film having the same structure. Absent a side-by-side comparison, the examiner lacks sufficient evidence that the prior art of record does not have the same structure. And since applicant has not discovered a way to analyze the structure, such evidence does not seem readily apparent.

“The Patent Office bears a lesser burden of proof in making out a case of prima facie obviousness for product-by-process claims because of their peculiar nature” than when a product is claimed in the conventional fashion. In *re Fessmann*, 489 F.2d 742, 744, 180 USPQ 324, 326 (CCPA 1974). Once the Examiner provides a rationale tending to show that the claimed product appears to be the same or similar to that of the prior art, although produced by a different process, the burden shifts to applicant to come forward with evidence establishing an unobvious difference between the claimed product and the prior art product. In *re Marosi*, 710 F.2d 798, 802, 218 USPQ 289, 292 (Fed. Cir. 1983). See also *Ex parte Gray*, 10 USPQ2d 1922 (Bd. Pat. App. & Inter. 1989).

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The lack of physical description in a product-by-process claim makes determination of the patentability of the claim more difficult, since in spite of the fact that the claim may recite only process limitations, it is the patentability of the product claimed and not of the recited process steps which must be established. We are therefore of the opinion that when the prior art discloses a product which reasonably appears to be either identical with or only slightly different than a product claimed in a product-by-process claim, a rejection based alternatively on either section 102 or section 103 of the statute is eminently fair and acceptable. As a practical matter, the Patent Office is not equipped to manufacture products by the myriad of processes put before it and then obtain prior art products and make physical comparisons therewith. In re Brown, 459 F.2d 531, 535, 173 USPQ 685, 688 (CCPA 1972).

Terminal Disclaimer

9. The terminal disclaimer filed on May 10, 2001 disclaiming the terminal portion of any patent granted on this application which would extend beyond the expiration date of U.S. patent application No. 08/765,836 has been reviewed and is accepted. The terminal disclaimer has been recorded.

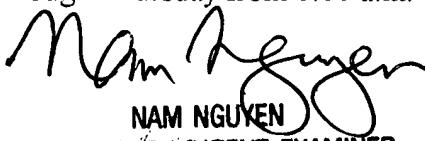
Conclusion

10. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

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A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Gregg Cantelmo whose telephone number is (703) 305-0635. The examiner can normally be reached on Monday through Thursday from 8:00 a.m. to 5:30 p.m.


NAM NGUYEN
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1700

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May 21, 2001